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Long-Term Patterns of Service Use and Cost Among Patients With Both Psychiatric and Substance Abuse Disorders

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OBJECTIVES. This is a longitudinal study designed to determine: (1) if patients dually diagnosed with psychiatric and substance abuse disorders incur higher health care costs than other psychiatric patients and (2) if higher costs can be attributed to particular subgroups of the dually diagnosed or types of care.

METHODS. Two cohorts of veterans treated in Veterans Affairs mental health programs at the start of fiscal year 1991 were followed for 6 years: one cohort of inpatients (n = 9,813) and the other of outpatients (n = 58,001). Data were analyzed on utilization of all types of Veterans Affairs health care. Repeated measures analysis of variance was used to examine cost differentials between dually diagnosed patients and other patients.

RESULTS. Dually diagnosed outpatients incurred consistently higher health care costs than other psychiatric outpatients, attributable to higher rates of inpatient psychiatric and substance abuse care; however, this difference decreased with time. Costs were substantially higher in the inpatient cohort overall, but there were no differences in cost between dually diagnosed and other patients.

CONCLUSIONS. In an atmosphere of cost cutting and moves toward outpatient care, the dually diagnosed may lose access to needed mental health services. Possibilities of developing more intensive outpatient services for these patients should be explored.

Key words: dual diagnosis; service utilization; health care costs. (Med Care 1998;36:835–843)

The complexity of problems faced by patients diagnosed with both psychiatric and substance abuse disorders (the dually diagnosed) has been amply demonstrated, and the special difficulties presented in their treatment have been widely acknowledged.[1,2] Nevertheless, there remains considerable controversy in the literature about patterns of service use and costs of care for these patients. Several researchers have found dually diagnosed patients to be exceptionally high service users.[3–7] Dickey et al,[4] for example, found that the annual cost of health care for dually diagnosed patients was $9,000 more than the costs for other psychiatric patients. Other researchers, however, have found dually diagnosed patients to use either lower or equal levels of services as other psychiatric patients.[8,9] In addition, although it is widely recognized that the problems faced by dually diagnosed patients are frequently chronic, most studies have been limited to a 1-year follow-up period.

With widespread changes in the funding structure of publicly funded mental health programs, the dually diagnosed stand out as a particularly vulnerable population. They are exceptionally troubled, suffering from multiple problems in addition to psychiatric disorders, including AIDS and homelessness, and are notably difficult to treat.[3,5–7,10] There is a substantial risk that such patients will either be overtreated as a result of uncoordinated and unplanned treatment or undertreated as a result of

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cost-cutting efforts. It is only by understanding sources of variation in the treatment of this potentially high-cost patient population and the relationship between patterns of care and outcomes that we can begin to systematically and rationally plan and monitor their care.

This article is an analysis of service use and costs associated with dual diagnosis in patients treated through the Department of Veterans Affairs (VA) mental health system. The VA offers an opportunity to observe service use in a large national sample of dually diagnosed patients similar in many ways to patients treated in state-funded mental health programs. The dually diagnosed are a growing proportion of public mental health patients, comprising, for example, more than 40% of VA psychiatric inpatient discharges in fiscal year (FY) 1995.[11]

There are several factors that are likely to influence the cost of care for both dually diagnosed and other psychiatric patients in the VA system. These include features such as sociodemographic characteristics, functional capacity, primary treating program (inpatient versus outpatient), specific types of services used, and local supply of services, particularly inpatient beds. Conflicting research findings about service use and cost among the dually diagnosed may be attributable to failures to adjust for, or stratify by, some combination of these factors.

This article utilizes longitudinal data on a national cohort of veterans being treated in VA mental health programs to address the following questions: (1) What individual characteristics are significantly associated with being dually diagnosed; (2) Are total health care costs for dually diagnosed patients higher than those for other psychiatric patients; (3) Are differences in the cost of dual diagnosis as compared to other patients dependent on inpatient or outpatient status at the time of case identification; and (4) What types of services account for the differences in overall cost between the dually diagnosed and other psychiatric patients.

Methods

Sources of Data

Data for these analyses came from three sources. First, a cross-sectional sample of outpatients was collected in a national survey of patients treated in VA mental health clinics during a 2-week period.[12] Mental health clinicians throughout VA filled out data sheets on each outpatient clinical encounter that occurred between October 15, 1990, and October 26, 1990. Because individuals could have more than one visit in this period, data were unduplicated by taking information only from the first visit. The cohort used in these analyses was restricted to those individuals from the original cross-sectional sample who had a valid Social Security number and at least one reported psychiatric diagnosis. There were 58,001 outpatients in the cohort who met these criteria.

The second source of data was the Patient Treatment File (PTF), a discharge abstract file of all completed episodes of inpatient care in the VA system. From the PTF, we identified those patients with a primary psychiatric diagnosis, not including substance abuse, who had occupied a VA mental health bed during the same 2-week period as the outpatient survey. There were 9,813 inpatients included in these analyses, 2,418 of whom were treated in both inpatient and outpatient departments during these 2 weeks. Those respondents receiving both types of treatment were classified with the inpatient sample.

The third source of data were two longitudinal service use files (the PTF, described above, for inpatient care and the Outpatient Care File (OPC) for outpatient care) that together record all hospital and outpatient services provided by the VA. These administrative databases were used to develop measures of each veteran's use of VA inpatient and outpatient psychiatric, substance abuse, and medical/surgical services from the beginning of FY 1991 (October 1, 1990) through the end of FY 1996 (September 30, 1996).

Independent Variables

The primary independent variable of interest was dual diagnosis. This variable was constructed among outpatients using a diagnostic checklist filled out by clinicians and among inpatients by recorded ICD-9 discharge diagnoses. A patient was categorized as dually diagnosed if there were concomitant psychiatric and substance abuse diagnoses reported by the clinician.

Other independent variables of interest included age, race, gender, whether the patient received VA disability compensation, and whether they had used non-VA services in the previous 6 months. All of these factors have been shown to

be determinants of utilization of VA services both cross-sectionally and with time.[13–15]

Other information on psychiatric status included the total number of reported psychiatric diagnoses, as well as dummy-coded dichotomous variables indicating several specific disorders: schizophrenia, major depression, bipolar depression, post-traumatic stress disorder, and other nonpsychotic psychiatric disorders. Comorbidity was used as an indicator of overall severity of psychiatric illness.[16] In addition, scores on the Global Assessment of Functioning Scale were available from the outpatient survey.[17]

The locus of treatment at the time of case identification was categorized as inpatient or outpatient. Because the sample was collected from two different data sources, these groups remained stratified in all analyses.

Dependent Variables

The primary outcome variable of interest was the annual cost of VA care. Costs were calculated for six types of care: inpatient and outpatient psychiatric, substance abuse, and medical/surgical care. Outpatient utilization was measured as numbers of visits and inpatient utilization was measured by numbers of bed days of care. These six utilization measures were calculated for each fiscal year from 1991 to 1996.

Costs were calculated by multiplying number of units of service by the average national unit cost for that service as derived from the VA's national Cost Distribution Report (CDR). The CDR is an account that identifies total expenditures and unit costs associated with all VA inpatient and outpatient health care services. Using accounting procedures standardized across the entire VA, both direct and indirect health care costs are identified and distributed over each major type of health care service.[18] All costs were calculated in 1991 dollars to control for inflation.

Analysis

Data analysis proceeded in several steps. First, characteristics of dually diagnosed patients were compared with those of patients who were not dually diagnosed. Second, total annual health care costs were determined for each of four groups: outpatient dually diagnosed and other psychiatric patients and inpatient dually diagnosed and other psychiatric patients. Repeated measures analysis of variance was used to determine: (1) if being dually diagnosed was associated with higher cost during the entire 6-year time period (a main effect for dual diagnosis), (2) if cost increased or decreased with time (a main effect for time), and (3) whether the difference in cost between dually diagnosed and other psychiatric patients changed with time (an interaction between dual diagnosis and time).

Third, an additional analysis was conducted to determine which particular services accounted for differences in cost between dually diagnosed and other psychiatric patients. Repeated measures analysis of variance again was utilized to examine the cost of inpatient and outpatient psychiatric, substance abuse, and medical care during the 6-year follow-up period. Repeated measures analyses were conducted in SAS using the MIXED procedure. The covariance structure used in these models was assumed to follow a pattern such that Time 1 was correlated with Time 2, Time 2 with Time 3, etc.. For more information on repeated measures analysis techniques, see Agresti.[20]

Results

Sample Characteristics

There were 58,001 veterans in the initial 2-week outpatient cohort and 9,813 veterans in the parallel inpatient cohort. Of the outpatients, 10.47% were identified as dually diagnosed, and, among inpatients, 32.90% were identified as dually diagnosed ($P = 0.0001$). Table 1 presents those personal characteristics that were associated with being dually diagnosed among both inpatient and outpatient cohorts. Males and nonwhite patients were more likely to be dually diagnosed in both inpatient and outpatient cohorts. Among outpatients, there was no association between service connection and dual diagnosis; however, those inpatients who had a service-connected disability were more likely to be dually diagnosed. The dually diagnosed were also younger in both cohorts, with a mean age of 45.24 years compared with 52.5 years among other psychiatric patients outpatients ($P = 0.0001$) and a mean of 41.7 years compared with 45.4 years among other psychiatric inpatients ($P = 0.0001$). History of use of non-VA services in the 6 months before the study and global functioning scores were only available from the outpatient cohort. In this group, the dually diagnosed were slightly but significantly more likely

TABLE 1. The Association Between Patient Characteristics and Being Dually Diagnosed in a Cohort of Veterans Being Treated in the Department of Veterans Affairs

	Outpatient Cohort					Inpatient Cohort				
	Not Dually Diagnosed		Dually Diagnosed			Not Dually Diagnosed		Dually Diagnosed		
Characteristic	*n*	%	*n*	%	*P*	*n*	%	*n*	%	*P*
Gender										
Male	49,372	95.22	5,941	98.04	0.0001	6,215	94.38	3,169	98.17	0.0001
Female	2,479	4.78	119	1.96		370	5.62	59	1.83	
Race										
White	40,611	78.55	4,274	70.55	0.0001	4,792	72.77	2,026	62.76	0.0001
Non-white	11,087	21.45	1,784	29.45		1,793	27.23	1,202	37.24	
Service connected disability										
None	24,945	48.04	2,998	49.37	0.1070	2,949	44.78	1,614	50.00	0.0010
Partial	14,487	27.90	1,628	26.81		1,204	18.28	767	23.76	
100%	12,497	24.07	1.446	23.81		2,432	36.93	847	26.24	
Use of non-VA services*										
No	39,353	76.34	4,498	74.53	0.002					
Yes	12,198	23.66	1,537	25.47						
Primary diagnosis										
Schizophrenia or bipolar	20,972	46.54	2,922	48.56	0.001	4,467	69.5	1,859	57.75	0.001
PTSD	8,415	18.67	1,928	32.04		839	13.05	859	26.69	
Major depression	5,869	13.02	1,026	17.05		791	12.31	488	15.16	
Other diagnosis	9,807	21.76	141	2.34		330	5.13	13	0.4	

PTSD, post-traumatic stress disorder.
*Only available among outpatient cohort members.

to have used non-VA services (23.1% versus 25.5%, $P = 0.002$). They also had lower functioning, with a mean score of 5.26 compared with 5.72 among the other psychiatric patients ($P = 0.0001$).

Total Health Care Costs

Figure 1 presents the mean annual costs for inpatient and outpatient dually diagnosed and other psychiatric patients. Veterans in the inpatient cohort had consistently higher costs during all 6 years of follow-up evaluation than outpatients. There were no significant differences in cost, however, between the dually diagnosed and the other psychiatric patients among inpatients. At each year of the follow-up period, their costs were essentially equal.

Among outpatients, however, the dually diagnosed had substantially higher annual total costs than other psychiatric patients at each year of the follow-up period. In addition, costs decreased steadily with time for both inpatients and outpatients, and the difference in cost between dually diagnosed and other psychiatric outpatients also decreased with time.

To test these relationships statistically and to risk adjust models for personal and diagnostic characteristics, repeated measures models were fit to both inpatients and outpatients. Inpatient data are not presented in tables because, although costs were determined to be significantly decreasing with time ($P = 0.0001$), there were no cost differences between the dually diagnosed and the other psychiatric patients even after controlling for other determinants of utilization and cost ($P = 0.653$).

Table 2 presents the results of repeated measures models in the outpatient cohort. The top section presents data on total annual cost. There are three major findings. First, the dually diagnosed

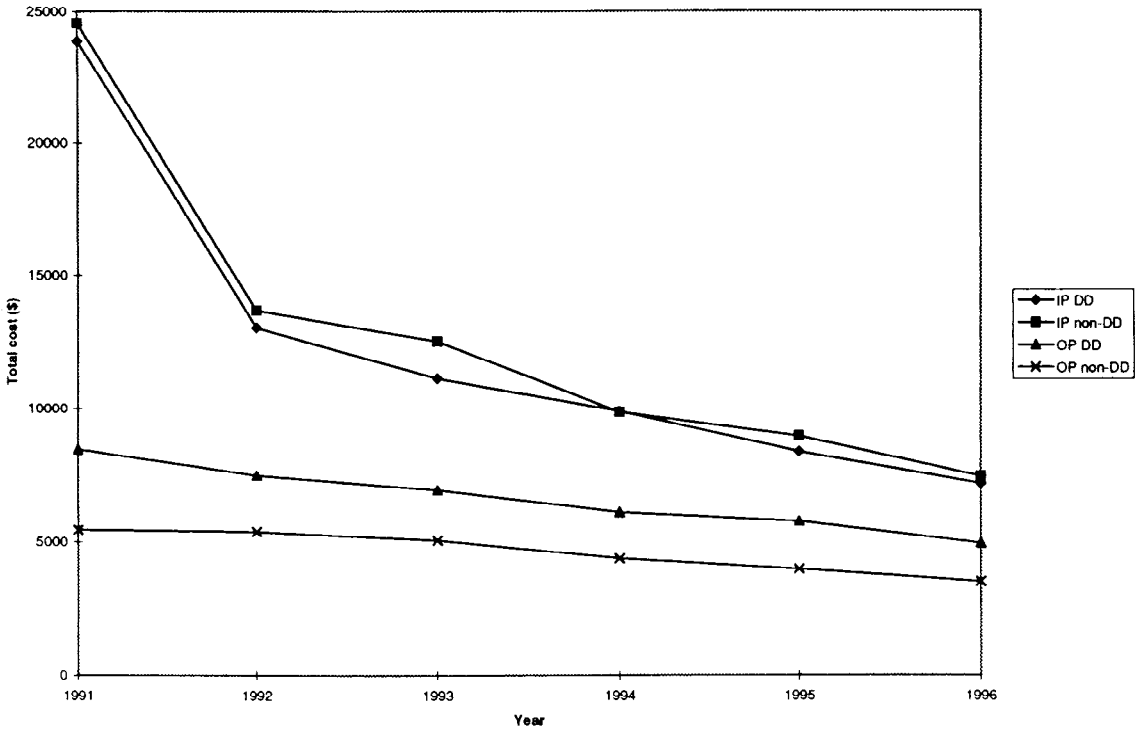

FIG. 1. Total annual costs of care stratified by inpatient/outpatient status at the start of follow up and dual diagnosis.

had significantly higher health care costs than the other psychiatric patients during the entire follow-up period ($P = 0.0001$). In 1991, for example, the first year of follow up, costs for dually diagnosed veterans averaged $2,502 (25.5%) more than for veterans with only a psychiatric diagnosis. Second, costs decreased significantly for both groups with time ($P = 0.0001$). Third, the differences in cost between the dually diagnosed and the other psychiatric patients decreased with time ($P = 0.0001$). For example, among the dually diagnosed, the mean annual cost of treatment decreased by $3,311 (26.9%) from 1991 to 1996, whereas the decrease in cost from among the other psychiatric patients was only $2,111 (21.5%).

All models presented in Table 2 were adjusted for age, sex, global functioning scores, race, service-connected disability status, use of non-VA services in the previous 6 months, and total number of diagnoses. Many of these variables were significantly associated with cost. Age increased cost by approximately $20 for every year increase ($P = 0.0001$); women had lower costs than men ($P = 0.0001$); race was marginally associated with cost ($P = 0.0258$), with nonwhite patients having lower cost than white patients; the use of non-VA services in the past 6 months reduced VA health care costs ($P = 0.0001$); and having a service-connected disability increased VA costs ($P = 0.0001$).

Costs Associated With Specific Types of Care

Table 2 also presents data on specific types of service use to determine whether the greater cost among dually diagnosed veterans reflects high use of particular types of care. As can be seen from the P-values presented in the three right-hand columns, the dually diagnosed had higher costs for outpatient substance abuse ($P = 0.0001$) and medical care ($P = 0.0001$), but not outpatient psychiatric care ($P = 0.4754$).

Dually diagnosed patients in the outpatient sample also had higher costs for inpatient psychiatric ($P = 0.0001$) and substance abuse care ($P = 0.0001$) than other psychiatric patients during the entire follow-up period. There was no significant difference, however, in cost of inpatient

TABLE 2. Adjusted Mean Annual Cost for Dually Diagnosed and Non-Dually Diagnosed Outpatients, by Type of Service, Over a 6-Year Follow-up*

								P Values for Tests of Significance		
Type of Service	Type of Patient	1991 ($)	1992 ($)	1993 ($)	1994 ($)	1995 ($)	1996 ($)	Dual Diagnosis	Time	Dual Diagnosis x Time
Total cost	Non-dually diagnosed	9,804	9,381	8,959	8,537	8,115	7,693	0.0001	0.0001	0.0001
	Dually diagnosed	12,306	11,644	10,982	10,320	9,657	8,995			
OP psych	Non-dually diagnosed	3,216	3,081	2,946	2,811	2,676	2,541	0.4754	0.0001	0.0001
	Dually diagnosed	3,249	3,067	2,885	2,702	2,520	2,338			
OP SA	Non-dually diagnosed	153	155	156	157	158	159	0.0001	0.0001	0.0001
	Dually diagnosed	808	760	713	665	618	570			
OP med/surg	Non-dually diagnosed	864	376	340	305	269	234	0.0001	0.0001	0.0001
	Dually diagnosed	1,066	973	881	789	696	604			
IP psych	Non-dually diagnosed	5,290	5,253	5,215	5,178	5,141	5,103	0.0001	0.0001	0.0018
	Dually diagnosed	6,238	6,137	6,036	5,934	5,833	5,732			
IP SA	Non-dually diagnosed	278	276	274	273	271	270	0.0001	0.0001	0.0001
	Dually diagnosed	739	706	673	640	607	574			
IP med/surg	Non-dually diagnosed	1,904	1,937	1,865	1,278	1,188	984	0.1256	0.0001	0.0959
	Dually diagnosed	1,972	1,737	1,512	1,125	1,147	877			

*Adjusted mean costs calulated from repeated measures models. All means are adjusted for age, sex, race, global functioning, total number of psychiatric diagnoses, service connected disability, and use of non-VA services in 1990.

medical/surgical care between dually diagnosed and other psychiatric patients ($P = 0.1256$).

Discussion

Overview

In this study, we used longitudinal data on a national convenience sample of VA patients to examine differences in the use and cost of VA health services between dually diagnosed and other psychiatric patients. We found that dually diagnosed outpatients incurred consistently higher health costs during an extended period of time when compared with other psychiatric outpatients. These greater overall costs were primarily attributable to the higher utilization of inpatient psychiatric and substance abuse services.

Limitations

Before discussing these findings further, several limitations of the data presented here must be addressed. First, data used to identify dually diagnosed patients were obtained through a diagnostic checklist among outpatients and from discharge abstracts among inpatients. Diagnostic classification is subject to the uncertainty related to both clinical assessment procedures and compliance with documentation procedures. These procedures are most likely to result in an underdiagnosis of substance abuse. This implies, however, that cost differentials reported here are underestimated.

A second limitation of these data is that VA service utilization and cost data do not address the local availability of inpatient services. This limitation restricts the conclusions we can draw about inpatient service use among VA patients because not all VA mental health programs offer such services. To investigate this, we tested the significance of an interaction between dual diagnosis and the number of VA inpatient mental health beds per 1,000 veterans in a given region. In areas that had few inpatient mental health beds, there was no cost differential between dually diagnosed and other psychiatric patients.

Another limitation of these data is that there is little information on the use of non-VA health services. There are, to date, no published data on cross-system use of VA and non-VA mental health services by veterans. Preliminary data analyses being conducted in collaboration with researchers at the University of Pennsylvania on cross-system use in Philadelphia have indicated that only 6.7% of those veterans who received specialty psychiatric services at the Philadelphia VA also received services from public sector providers or services funded by Medicare/Medicaid. It is unlikely that more than 10% of the sample used in these analyses were also receiving mental health services in non-VA settings.

Treatment Locus at the Time of Case Identification

The substantial differences in these analyses between veterans who were inpatients at the time of case identification and those who were outpatients provides a plausible explanation for the previously noted discrepancies in the literature. The sample used by Dickey and Azeni,[4] for example, included both inpatients and outpatients. Bradley and Zarkin,[9] in contrast, exclusively studied discharged inpatients. The findings of Bradley and Zarkin are consistent with our findings among VA patients who were inpatients at the start of the follow-up period. Future studies of the dually diagnosed should adjust for the primary locus of treatment at the time of case identification.

This observation has substantive as well as methodologic implications. The observed differences in costs between inpatients and outpatients were not explained by observed differences between groups in diagnosis or in the total number of psychiatric diagnoses, because these variables were controlled in statistical models. It seems likely that the inpatient sample was, overall, a sicker, lower functioning, and more disadvantaged population. These difficulties could outweigh the specific effect of comorbid substance abuse, serving to equalize the health care needs of dually and singly diagnosed patients sick or disabled enough to require hospitalization.

Decreasing Costs With Time

Overall health care costs decreased with time for all patients in this sample. This is not surprising, because any cohort with a nonlethal disease followed for a period of time would be expected to have decreasing utilization. An especially interesting result is that costs decreased faster with time among the dually diagnosed than among other psychiatric patients. This could be explained by a number of factors.

First, the dually diagnosed dropped out of care at slightly higher rates than the singly diagnosed—74.7% of the other psychiatric patients were still in care in 1996, whereas 73.88% of the dually diagnosed were still in care ($P = 0.003$). If those who dropped out of care were removed from the analysis of total cost, however, and the analysis is replicated on the smaller sample who did not drop out, the cost patterns remained the same.

Second, closures of inpatient substance abuse beds might be hypothesized to explain why the costs for the dually diagnosed decreased faster with time. The supply of VA substance abuse beds was not decreasing during the follow-up period of this study; in fact, the number increased from 1990 to 1995. Substantial closings of those beds did not occur until FY 1996.[11]

Third, dually diagnosed patients may need less care with time. Most of the outpatient sample already had been diagnosed and in treatment for some time (76.8% had been in treatment since at least 1989). The relatively long follow-up period may be enough time to see some recovery from substance abuse and stabilization of other psychiatric disorders.

Implications for Health System Development

The implications of these results apply not only to the VA, but also to other public mental health systems. With the move toward managed mental health care, this severely disabled population is at risk of losing substantial portions of currently available care, particularly inpatient care. Most mental health systems do not have specialized programs that are equipped to handle the particular challenge of these patients, resulting in fragmented care. As certain types of care become less available, patients will shift to more general psychiatric services, which may not be able to care for them appropriately. In addition, systems may be able to reduce their own costs by cutting specialized programs, but in so doing may shift the cost of care to other sectors.

Implications for Clinical Care

A major difficulty in treating this population has been that the values underlying treatment models for mental health and substance abuse are, in some respects, in conflict. For example, Assertive Community Treatment (ACT) teams have been viewed by some as enabling of substance abuse behavior. Conversely, substance abuse treatment that is confrontational has been viewed as destabilizing to seriously mentally ill patients. A specialized dual diagnosis program has been developed that uses a modified ACT approach and has reported abstinence periods of more than 2 years for 61% of its clients.[20]

The success of this intensive treatment approach to dually diagnosed patients suggests that, as inpatient beds continue to become more scarce, outpatient services must be intensified to fill the gap. These services are likely to be more expensive than more traditional case management approaches in the short term, but they may be more cost-effective in the longer term.

The data presented here draw attention to the need to engage and maintain these patients in treatment, but also leaves unanswered many research questions about the best way to cost-effectively provide treatment. Future research on dual diagnosis and its treatment should be concentrated on replicating these results, investigating whether treatment translates into reduced costs longitudinally, and investigating what treatment modalities are most effective with this population.

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